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Mr McNerny might like a copy.

Spate of gas drilling leaks raises Marcellus concerns
Rebecca Renner Environ. Sci. Technol. September 2

As Pennsylvania and other eastern states prepare for a rush of new drilling associated with the Marcellus Shale , gas leaks are prompting questions about whether these states are prepared. On New Year's Day, 2009, in the tiny northeast Pennsylvania town of Dimock, a drinking-water well blew up because of a methane leak associated with natural-gas drilling nearby. In the spring, high levels of methane—a result of a poorly cased gas well—were found in water supplies in the town of Bradford; in late July, one home near Roaring Brook was evacuated, and alternative sources of drinking water were provided when high gas pressure at another well caused a leak.

Natural-gas leaks are relatively common in Pennsylvania, which employs a full-time geologist to investigate such incidents. In recent years, some of these leaks have had devastating consequences, including home explosions and fatalities, according to an investigation by ProPublica, Inc., an independent nonprofit newsroom. Leaks are mainly a legacy of the state's fossil fuel drilling and mining history; however, leaks from operating wells have caused explosions and even fatalities.

Tracing the leaks is difficult, because sources include gas wells, natural-gas storage fields, pipelines, coal mines, and landfills—all of which can be either active or abandoned. Bacterial degradation of organic matter also produces methane. Stable-isotope analysis is an essential tool for identifying the source, according to Pennsylvania Department of Environmental Protection (PA DEP) geologist Fred Baldassare, who investigates stray gas leaks.

The carbon and hydrogen isotopic ratios in methane distinguish three broad sources, according to isotope pioneer Dennis Coleman at Isotech Laboratories, Inc. These are: thermogenic gas from geological formations; “drift gas” formed by microbial breakdown in shallow, unconsolidated deposits; and gas formed by bacterial degradation (e.g., in wetlands or bovine digestive systems).

Tracing the leak can also be highly contentious, as in the case of the hydraulic fracturing wells drilled into the Marcellus formation at Dimock. In February 2009, PA DEP cited the drilling company Cabot Oil & Gas Corp. for violations of the state's Clean Streams Law with respect to the Dimock explosion. Cabot contends that methane in drinking-water wells is a historical problem locally and that drilling may not be the cause, according to spokesperson Kenneth Komoroski. But stable-isotope analysis indicates that the gas in drinking-water wells is geological. The additional presence of heavier hydrocarbons, ethane, propane, and butane supports this. Drift gas, which commonly occurs in low concentrations near the surface, is not the culprit, says Baldassare. “The isotopes and the heavier hydrocarbons nail it,” he adds.

“Stable isotopes help us to narrow the focus of our investigations by ruling out some sources. Then we go to the potential source and utilize other investigative techniques to confirm the source of the stray gas,” says Baldassare, who coauthored a study with the U.S. Geological Survey that traced

stray gas to a leaking underground storage system and is involved in organizing a November stray-gas workshop.

The recent leaks are related to flaws in cement, well casing, or overpressurization of the casing. PA DEP is in the process of tightening policies that apply to these issues, according to spokesperson Teresa Candori.

A source who has 30 years of experience in the public and private sectors tells ES&T that the regulations need some changes, but “the problem is not enough inspectors. Wells get inspected only once, and many inspectors don't have enough experience,” the source says. A recent study of state regulations across the country found that most states have standards specifying the use of concrete to protect aquifers, but many, including Pennsylvania, do not require testing to show that the concrete is strong enough for the task. Congressional proposals call for changes in such regulations.

Given the promise and peril of the coming drilling boom, few knowledgeable people are willing to talk on the record. But, says one experienced geologist, “Deep horizontal drilling and hyrdaulic fracturing don't have a track record in the northeast. Pennsylvania and New York aren't Texas. Our geology is more complex, our rocks have been through more deformation. Companies and regulators need to tread carefully.”